In response to the need for management of runoff from agricultural lands, the North Carolina Agricultural Cost Share Program (ACSP) was implemented in 1984 in selected counties in the Coastal Plain by the North Carolina Division of Soil and Water Conservation. The purpose of the ACSP is to reduce the input of agricultural nonpoint-source pollutants into the streams, lakes, and estuaries of the State through the application of best-management practices. The ACSP provides funding for the installation of flashboard risers in ditches and canals that drain agricultural lands. Tide gates, however, are not an approved best-management practice by the ACSP because the off-site benefits of tide gates have not been well documented.

In 1988, the U.S. Geological Survey (USGS), in cooperation with the North Carolina Department of Environment, Health, and Natural Resources, began an investigation to address issues concerning artificial drainage of cropland, water-control structures, and estuarine receiving-water quality. The objectives of the investigation were to (1) quantify nutrient and sediment concentrations, and freshwater inflow to canals that collect drainage from cropland ditches, (2) determine the effects of tide gates and flashboard risers on receiving-water quality, and (3) characterize the effects of drainage on the salinity regime of a tidal creek.

Study sites were established in two locations; tide-gate sites were located in Hyde County, and flashboard-riser sites were located in Beaufort County (fig. 1). These sites were on agricultural drainage canals that receive land-surface drainage from upland field ditches. Also, data were collected in Campbell Creek, which receives drainage from two Beaufort County canals.

A tide gate was installed in one of the Hyde County canals upstream of site H1 (fig. 2) in May 1988; tide gates were installed in the remaining Hyde County canals upstream of sites H2 and H3 in August 1990. State funds were appropriated for the installation of the tide gates. Tide gates were installed by the landowners with assistance from the Hyde County Soil and Water Conservation District.

A flashboard riser was installed in one of the Beaufort County canals upstream of site B1 (fig. 3) in July 1988; flashboard risers were installed in the remaining canals upstream of sites B2 and B3 in April 1991. Installation of flashboard risers was funded cooperatively by the landowner and the ACSP. Flashboard risers were installed by the landowners with assistance from the Beaufort County Soil and Water Conservation District.

Data collected from May 1988 through September 1990 were published in an open-file report by the U.S. Geological Survey (Treece and Bales, 1992). Data collection at site B1 was discontinued on September 30, 1990, because there were frequent periods of no flow in the canal and because the canal was subject to severe scouring during high-flow periods, which limited collection of meaningful data. Data collection continued at the other Hyde and Beaufort County sites through May 1, 1992.